

**INFORMAL COMMENTS OF
THE SOLAR ENERGY INDUSTRIES ASSOCIATION ON THE CALIFORNIA
PUBLIC UTILITIES COMMISSION STAFF PROPOSAL ON REACTIVE POWER
PRIORITY SETTING OF SMART INVERTERS**

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August 11th, 2017

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In response to the Staff Proposal on Reactive Power Priority Setting of Smart Inverters submitted to the Smart Inverter Working Group and parties in Rulemaking R.11-09-011, the Solar Energy Industries Association (SEIA) provides the following comments.

I INTRODUCTION

SEIA appreciates Staff's Proposal for helping highlight an important issue and propose a path forward. While we agree with the technical merits of moving to a reactive power priority there are significant uncertainties in how such a move will impact specific projects. In addition, there is an outstanding question about what functions should be compensated, which we understand will be a focus of the Integrated Distributed Energy Resources (IDER) proceeding (R.14-10-003) proceeding this fall. Given these outstanding questions we do not believe that this staff proposal and the advice letter process constitute the appropriate forum for establishing a reactive power priority. The Rule 21 proceeding (R.17-07-007) and IDER proceeding are forums for addressing the technical issues and any compensation, respectively.

**II SEIA AGREES THAT A REACTIVE POWER PRIORITY COULD ENHANCE
HOSTING CAPACITY**

The State of California is undergoing studies and rulemakings in a number of proceedings and forums to determine what costs will be needed to incorporate greater amounts of distributed energy resources into the distribution system and how to get a more accurate read of hosting capacity. These examinations and changes to interconnection are needed now to overcome interconnection challenges faced today by larger projects which often grapple with

uncertainty and delays in interconnections and often pay the costs of the upgrades for which they are ultimately responsible.

SEIA agrees on a technical basis that providing for some provision of reactive power support, can overcome the acute challenges faced by some of these projects and be a cost-effective solution for integrating high penetrations of distributed generation. A recent study conducted by the Hawaiian Electric Company and the National Renewable Energy Laboratories¹ suggests volt/var can manage voltage deviations at very high penetrations with minimal curtailments for 95% of customers. Research on Southern California Edison's system suggests a range of advanced inverter functions (including volt/var and volt/watt) are capable of facilitating reaching increasing levels of distributed energy resource deployment².

Acting on this research needs to account for differential impacts to different systems and uncertainty about those impacts. This has been acknowledged by some stakeholders and Hawaiian Electric in a recent stipulation to recommend activation of some advanced inverter functions and the development of a framework to mitigate customer risk from the activation of advanced inverter functions³. However, it is important to note that rooftop solar penetration is much lower in California. For example, this study included a circuit starting with a current PV penetration in relation to estimated gross daytime minimum load at 150% that grows to 635

Due to the uncertainties surrounding the impacts to individual systems, we recommend consideration of a reactive power priority in R.17-07-007.

III DIFFERENTIAL IMPACTS OF REACTIVE POWER PRIORITY MUST BE CONSIDERED IN ANY MOVE TO REQUIRE SUCH A PRIORITY

¹ <https://www.nrel.gov/docs/fy17osti/67485.pdf>

² http://drpwg.org/wp-content/uploads/2016/07/CEC_SCE-Phase-3-Interim-Report-2016-07-21.pdf

³³ Parties' Stipulation for Proposed Revisions to Tariff Rules 14H and 22; Exhibits A and B (Filed August 7th, 2017) Hawaii Public Utilities Commission, Docket 2014-0192

The aforementioned research conducted by NREL and HECO suggest that curtailment could be minimal even at very high penetrations. However, this result would be for all but 5% of customers whom could see curtailment up to 15% annually. Likewise, the NREL study does not include any behind the meter curtailment assessment beyond the assumed 1% behind the meter voltage rise, thus customers that are unable to achieve this very low level of behind the meter electrical losses, would see additional curtailment beyond what the study indicates. These generalized findings demonstrate the fact that curtailment is likely to vary depending on location, with limited to no ability for customers to practically evaluate risk in whole or in part. In some locations, particularly for customers having long shared service conductors and a large number of customers connected to the shared transformer, there is greater overvoltage risk, leading to curtailment that could be routine and material. Therefore, even if research bears out that curtailments are, on *average*, low, by mathematical nature for some customers, the actual curtailments could be substantial for those customers.

Oversizing inverters may be a solution for a number of customers, but it is not a panacea. Particularly smaller systems face material costs from oversizing their inverter, and may trigger additional electrical upgrades that would not have been needed had the inverter not been oversized to avoid curtailment. These upgrades could be costly if they include panel upgrades on non-new construction homes seeking to add solar and significant panel upgrades on larger systems for multi-unit housing, commercial and industrial buildings and other larger systems which could adversely affect the economics of customers choosing solar. Microinverters are sized to optimize production from PV panels and are not yet available in slightly-oversized sizes needed to provide necessary headroom. Some larger systems undersize their inverters to enable interconnection where there is otherwise limited hosting capacity. These are a few of the very

practical limitations which make a move to reactive power priority problematic without consideration in a forum which is more robust than an advice letter process.

IV. DISTRIBUTION UPGRADE COSTS HAVE BEEN MODEST THUSFAR AND REACTIVE POWER PRIORITY AS A MITIGATION STRATEGY NEEDS FURTHER EXAMINATION

There are uncertainties about the cost of upgrading the distribution system in scenarios where VARs are guaranteed to be available by an inverter versus scenarios where there is a real power priority. SEIA is glad that the Commission has commissioned an examination of this in its study on ZNE integration⁴ costs. However, we disagree with a number of assumptions, particularly that storage will be a solution deployed to manage voltage deviations rather than to provide TOU arbitrage or other primary customer benefits which can make voltage management a secondary benefit at no incremental cost. As the study itself notes costs of upgrading the grid to integrate distributed generation and the high cost scenarios they identify are unlikely to materialize and that, to date, upgrade costs have been modest.

The Rule 21 proceeding and the IDER proceeding are appropriate forums to examine the technical considerations and the resulting cost impacts and the relative costs and benefits of requiring systems to have a reactive power priority. The result of that examination can feed into any new rules for cost allocation that are determined in the net metering proceeding expected to commence in 2019.

V. DETERMINING COMPENSATION FOR ADVANCED INVERTER FUNCTIONS IS A KEY TASK FOR THE IDER PROCEEDING AND POTENTIALLY RULE 21 AND NEM REVISIT IN 2019

Beyond “good grid citizen” functions identified as “Phase 1” functions by the Smart Inverter Working Group, there are a number of inverter functions including dynamic Volt/VAR

⁴ Residential Zero Net Energy Building Integration Cost Analysis

and Phase 3 functions, which could provide enhanced voltage management and other services. SEIA is glad to see this issue raised in the initial OIR in the interconnection proceeding (R.17-07-007) and it is our understanding that the Integrated Distributed Energy Resources proceeding is going to be examining “sourcing” mechanisms for compensating DERs to provide distribution grid voltage management functions.

VI SEIA SUPPORTS THE LANGUAGE REVISIONS IN THE STAFF’S PROPOSED REVISION TO SECTION Hh OF RULE 21

SEIA notes that Section Hh focuses on *capability* and not on a requirement that those capabilities be *operational*. We therefore do not have changes to what Staff has proposed for tariff language, though we believe this is not what the proposal intends, which is to move to a reactive power priority. As noted above, we do not support a move to reactive power priority at this time.

VII CONCLUSION

Thank you to Staff for distilling this issue into a proposal and providing a forum for stakeholder feedback

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